

Inquiry and Investigation Lesson Plan

Lesson Plan

(Modified from: Science Olympiad “Mystery Architecture”)

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Core Curriculum Standard Fulfilled:

Standard IV: Students will understand the relationships among energy, force, and motion.

Core Curriculum Objective Fulfilled:

Objective 2: Examine the force exerted on objects by gravity.

- d. Design and build structures to support a load.

Intended Learning Outcomes (ILO's) Fulfilled:

- 5. Demonstrate Awareness of Social and Historical Aspects of Science
 - a. Cite examples of how science affects life.
 - b. Give instances of how technological advances have influenced the progress of science and how science has influenced advances in technology.
 - c. Understand the cumulative nature of the development of science knowledge.
- 6. Demonstrate Understanding of the Nature of Science
 - a. Science is a way of knowing that is used by many people, not just scientists.
 - b. Understand that science investigations use a variety of methods and do not always use the same set of procedures; understand that there is not just one "scientific method."

Time Needed To Complete Inquiry: Approximately two 45 minute class periods.

Inquiry: This is an open inquiry assignment. Groups of students will be given a bag of building materials along with the research question, “How can we use only these materials to construct the tallest tower that will support the weight of a softball?”

Assessment: Student Worksheet

Prior Knowledge Needed: Students should be familiar with the concept of gravity and how the force of gravity relates to the mass of an object.

Introduction: This is a lesson designed to test the students’ ability to think on their feet. Groups will be given identical bags of building materials and asked to construct a specific device or structure (in this case the tallest tower that will support the weight of a softball). The contents may include, but are not limited to: straws, tape, paper cups, paper clips, string, paper, Popsicle sticks, thumbtacks, etc. The actual materials given is up to the

teacher. If the device is required to support a load, the load (softball) will be available to the students so they can incorporate it into their building plans. The students may remove the load until immediately prior to testing the device by the judges.

Materials / Resources Needed for the Investigation: 20+ drinking straws for each group of students, approximately 1m of tape, (any other materials you feel are appropriate for the activity)

Procedures of the Investigation: On the first day of the lesson groups will be given their bag of materials, student worksheet, and building objective. The remainder of the period will be reserved for groups to construct their structure. On day two groups will measure and test their towers and answer questions on the student worksheet.

Data Collection: Students will test their structure with the load during the building process and make any adjustments they feel are necessary.

Data Analysis: The class will compare the best towers to each other and look for similarities in design.

Closure: Class discussion on the strength and best use of materials and why it is important to consider the direction of the force of gravity when constructing a structure to support a load.

Names: _____
Date: _____
Period: _____

Straw Tower Building Project Student Worksheet

Description

In this project student teams will be charged with building the highest tower that will support the weight of a softball using nothing but the materials provided in the project bag.

Pre-build

Design: In a short paragraph describe the force/s that you must overcome during this project and what your reasoning is behind the design of your tower.

Sketch: Draw a picture of what your tower will look like.

Analysis Questions

1. What went well with the design of your tower?
2. What would you change about your design if you could do it over?
3. Was there any similarities among the best designed towers? If so, why do you think this was the case?

Scoring

Tower supported the load	5					0
Height of the tower	5	4	3	2	1	0
Pre-build completed appropriately	5	4	3	2	1	0
Analysis Questions answered appropriately	5	4	3	2	1	0

Total: _____